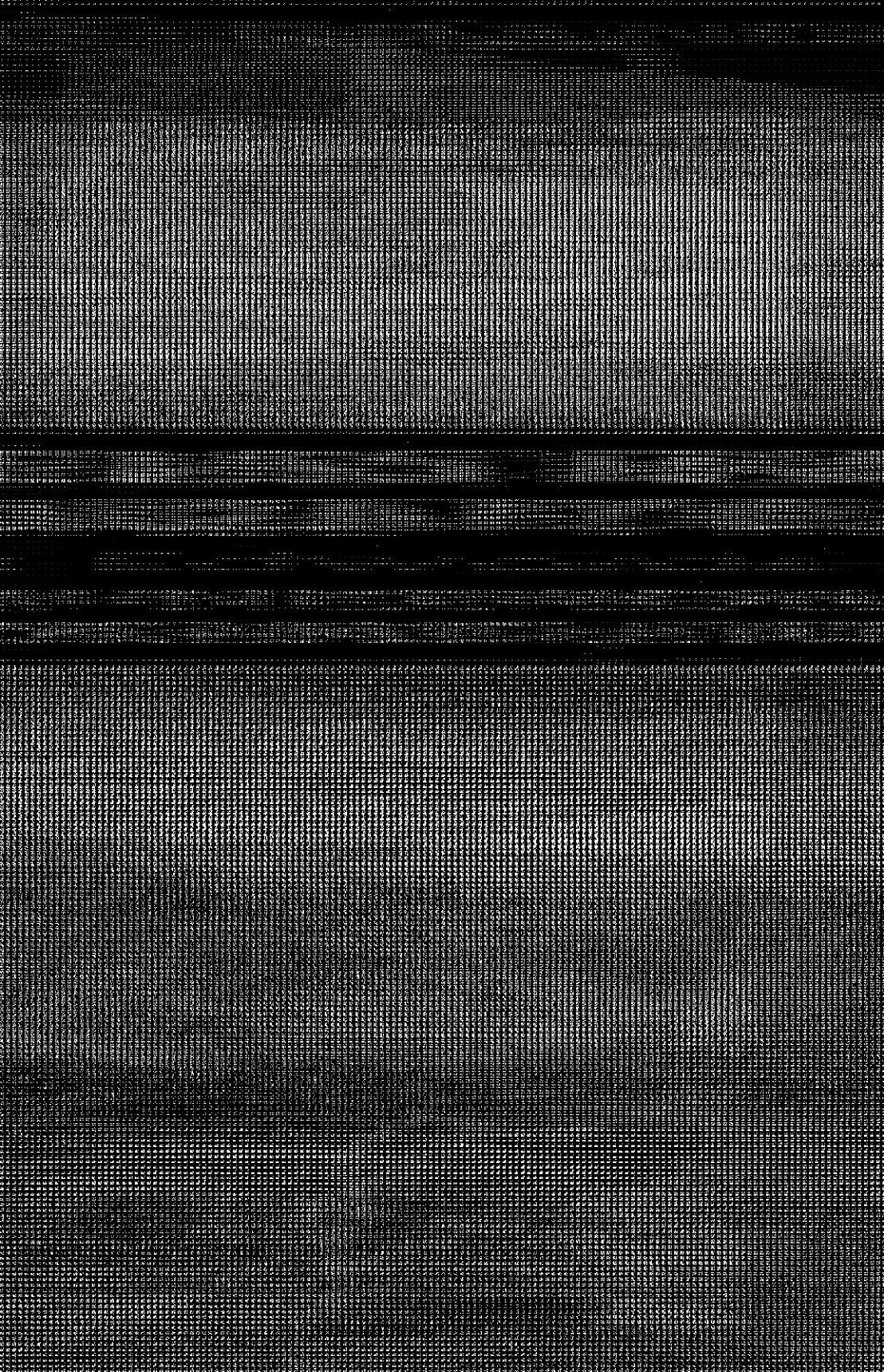

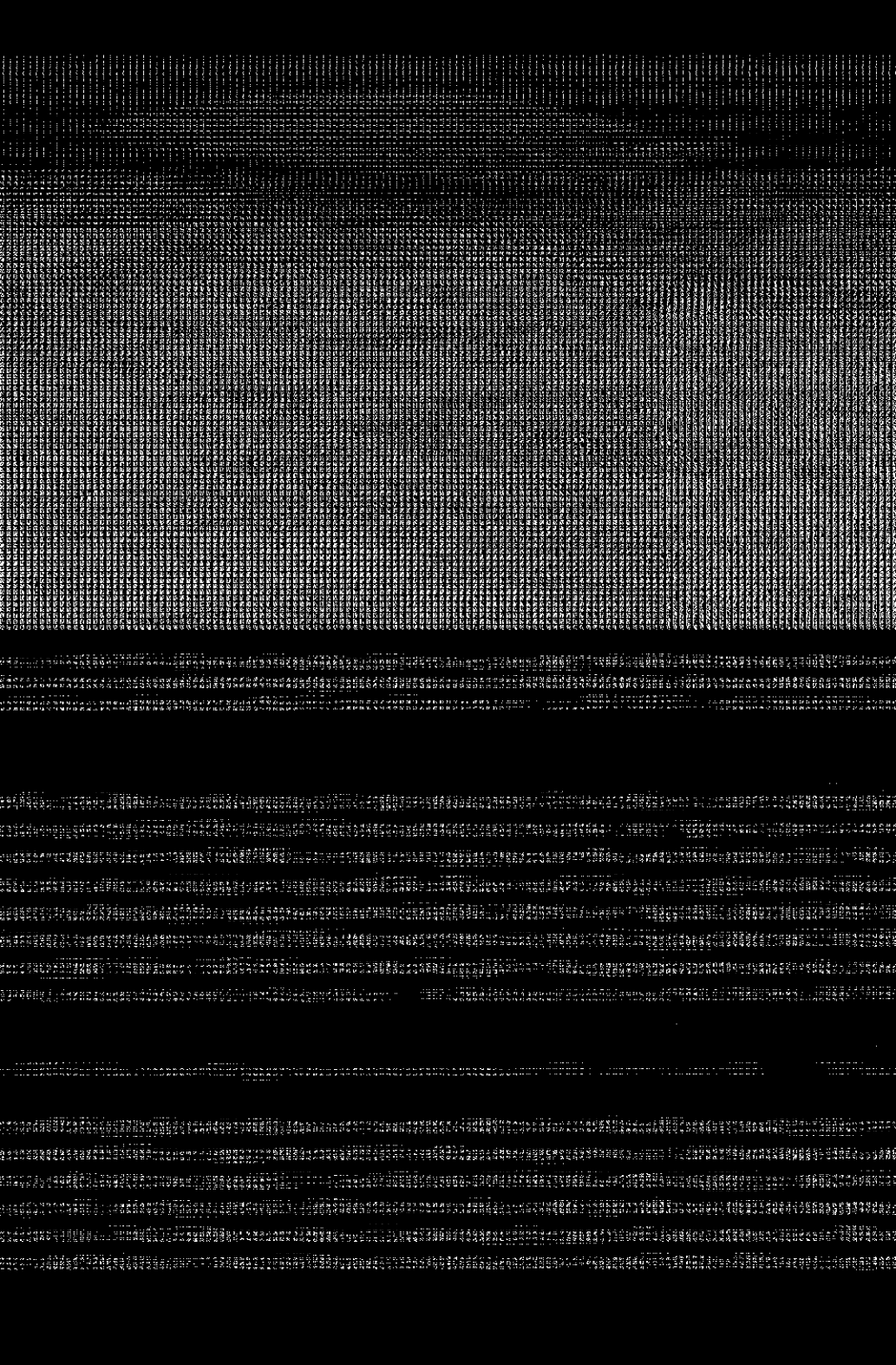

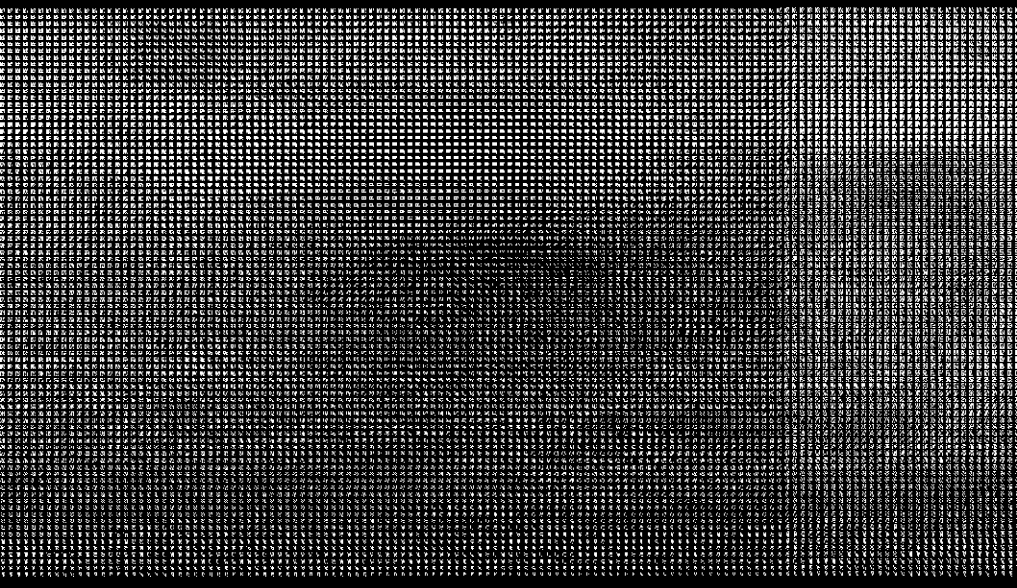

"A successful program to increase food supplies in developing countries needs to be accompanied by companion strategies to maintain balanced growth throughout the economy. The companion strategies serve to increase the availability of local resources, introduce appropriate technologies in the nonfarm sectors, expand markets for local products, ensure equitable regional distribution of economic gains, and build appropriate institutions."

The Author

Clark Edwards is a senior economist with the Economic Development Division, Economic Research Service, U.S. Department of Agriculture. The research underlying this bulletin was done while the author was detailed to the Agency for International Development during 1976. He has recently authored two publications relating to balanced economic growth in the U.S. economy: **Strategies for Balanced Rural-Urban Growth** (AIB-392) and, with Rudolph DePass as coauthor, a more technical treatment of the subject titled **Alternative Futures for Nonmetropolitan Population, Income, Employment, and Capital** (AER-311). Single copies of both are available from ERS Publications, Room 0054-S, U.S. Department of Agriculture, Washington, D.C. 20250.

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STRATEGIES FOR BALANCED GROWTH IN DEVELOPING COUNTRIES

Clark Edwards

When an agricultural innovation is adopted in a developing country, it usually increases food supplies and improves diets. That, after all, is the purpose of introducing the innovation. More and better food helps feed the hungry, supports a growing population, and provides an agricultural surplus which can be invested in industrial development.

But programs introduced to spur progress do not always produce unmixed blessings. Planners frequently overlook the possibility of unintended side effects, some favorable and some not. For example, those who master a new agricultural technology gain. But those who do not understand or adopt the new ways do not gain and, in fact, may become worse off. The resulting increase in gross national product may be accompanied by a widening economic gap between the rich and the poor. Both favorable and unfavorable side effects of agricultural development programs need to be identified and companion programs need to be devised to achieve balanced growth.

Monitoring balanced growth requires measures of well-being in several sectors of the economy. For agriculture, one can measure whether gains in productivity increase aggregate food supplies while contributing to increased net incomes and capital accumulation. However, agriculture is not homogeneous. As some farmers adopt new ways of doing things and increase profits, others continue in traditional patterns. Traditional farmers may face rising costs of land, capital, and purchased farm inputs, as well as falling product prices. Reduced levels of living on traditional farms may be accompanied by limited nearby nonfarm economic opportunities. As a result, it may be observed that ". . . the purchasing power of the common man is falling" *[17, page 1]*. For sectors outside of agriculture, one can measure whether linkages to agriculture are inducing increased employment and income. The nonfarm sector is not homogeneous either. New jobs and increased income may be induced in the central cities while hardships and limited nonfarm economic opportunities persist or worsen in villages.

Balanced growth strategies to overcome such side effects require multifaceted programs which increase technology in rural and urban industries as well as in agriculture. Programs, such as infusion of capital, will be needed to enhance resources. New markets for farm and nonfarm products, both domestic and foreign, will be needed. Programs will be needed to develop transportation, improve rural as well as urban life, and maintain regional balance. And institutions

will be needed to promote markets, resolve conflicts, educate, and assimilate new ways of doing things into a traditional society.

This paper examines impacts of programs to develop agriculture. Side effects are noted both within agriculture and between agriculture and the nonfarm sectors. Strategies are discussed which can maintain balanced growth among the farm and nonfarm economic sectors as agriculture advances. Strategies focused on agriculture, both advancing and traditional, are addressed first. Then strategies focused on the nonfarm sectors, both urban and rural, are examined.

The Agricultural Sector

A traditional, subsistence agriculture has relatively simple and minor linkages with the nonfarm sector. Food and fiber grow close to final markets. Much of the produce is consumed on the farm where it is produced, or in nearby villages; relatively little is transported to major cities for processing and domestic distribution. Markets are of relatively minor local importance. If a large share of agricultural output is exported, relatively little value is added through domestic processing. Techniques of agricultural production in such nations tend to be simple and require little in the way of advanced machinery, fertilizer, and other purchased farm inputs. Impacts of changes in the production, processing, distribution, or consumption patterns within traditional agricultural systems are rarely felt beyond the local village.

As improved agricultural technology is adopted and the traditional system begins to be replaced by an advancing one, the agricultural sector becomes more complex. The increase in supply of farm products above local village needs induces the need for various nonfarm economic activities related to transportation, processing, and marketing. These are called forward linkages. In addition, demands for more and different kinds of farm inputs induce various nonfarm economic activities related to providing seed, fertilizer, fuel, equipment, credit, and others. These are called backward linkages. Formation of these linkages helps to determine the success of the agricultural advance. Backward linkages are caused directly by demand for inputs. Forward linkages may anticipate demands for final products or hope to induce them. This accounts for Hirschman's contention that: "backward linkage effects are much neater than forward linkage effects. Forward linkage could never occur in pure form. It must always be accompanied by backward linkage" *[14, p. 116]*.

If the linkages do not form, the advance will fail because an advanced agriculture can survive only with nonfarm specialization in industries that supply inputs and that transport, process, and distribute outputs. If linkages form inappropriately, potential gains from the advance will be maldistributed. When linkages form, they tend to be accompanied by new marketing institutions; the advancing agriculture tends to purchase inputs and sell outputs in different markets than those used by traditional agriculture.

Magnitude of Linkages

In a developed economy, linkages of the farm to nonfarm sectors are sizeable. Forward and backward agricultural linkages together add more to national income and output than the initial values of the increase in farm output. Some impacts work through the economy quickly. Some permeate more slowly. Forward linkages are larger than backward ones. (For a classification of all industries with respect to forward and backward linkage see *[4]*.) In the United States, for example, an increase of $1,000 in farm output can be expected to induce more than $3,000 in forward linkages *[36]*. Primary effects are on the following industries: food and kindred products, textiles and apparel, wood products and construction, chemicals and drugs, transportation and communication, and wholesale and retail trade.

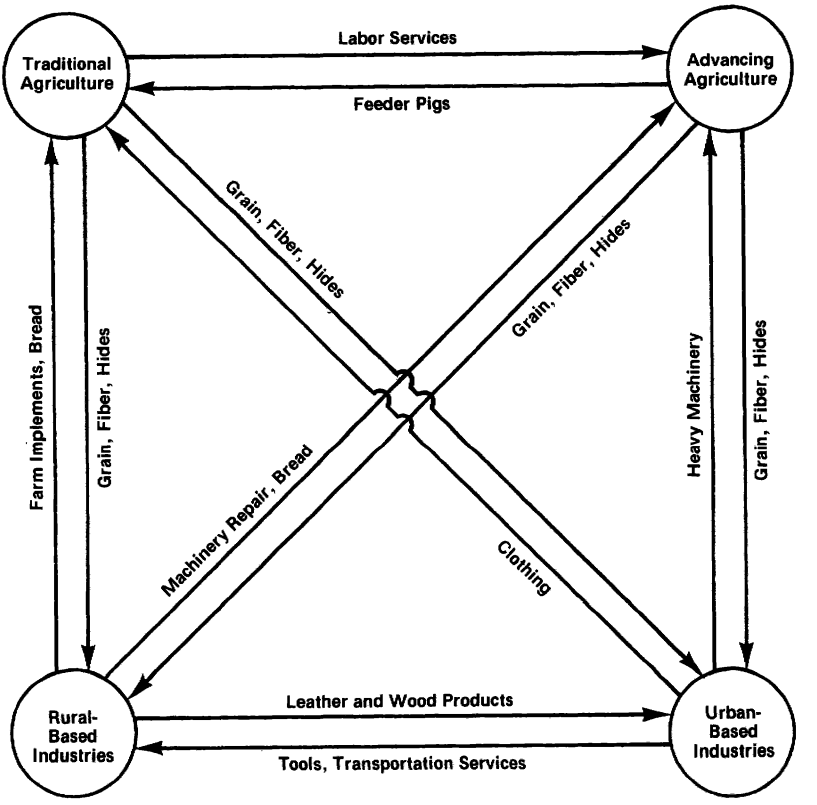
Demands by farmers for purchased farm inputs associated with a $1,000 increase in U.S. farm output can generate nearly $2,000 in added backward linkages. Primary impacts are on the following industries: energy sources, such as coal, gas, oil, and electricity; natural resource industries, such as mining and water; machinery and equipment; miscellaneous manufacturing, such as plastic, wire, and glass; transportation and communication; wholesale and retail trade; financial services; and processed farm products, such as food, feed, fabrics, and fertilizer.

Nonfarm linkages with an advancing agriculture create jobs as well as income. If U.S. farm output were expanded using present technology to create 1,000 new jobs on the farm, forward linkages would induce more than 1,500 additional jobs while derived demand for backward linkages would induce nearly 1,000 additional jobs.

Undeveloped economies have limited forward and backward linkages of agriculture to the nonfarm sector, while developed economies have linkages which account for more income and employment than is found in the originating agricultural sector. As commercial agriculture expands, one of the important side effects will be associated with inducements to develop these linkages.

Economic Sectors

Because up to 80 or 90 percent of the people in a developing country may be engaged in agriculture, economic development is often considered agricultural development. Or, at least, rural development is assumed synonymous with agricultural development. Both assumptions are misleading. There is a tendency for analysts to force such nations into a mold wherein all nonfarm activities occur in the urban centers and rural economic activity consists solely of an advanced agriculture. This view has led to a chicken and egg type of argument as to which of the two sectors is the leading edge of development and which the follower. Development programs are then focused on the supposed leading edge and multi-



Our discussion places the production of economic goods and services in a developing nation in four sectors: traditional agriculture, advancing agriculture, rural-based industries, and urban-based industries. Illustrative (not exhaustively complete) exchanges–forward and backward linkages–among sectors are indicated here by the arrows. For example, the rural-based industries may purchase hides (backward linkage) from traditional agriculture and sell shoes (forward linkage) to the urban sector. And they may purchase tools (backward linkage) from the urban sector and manufacture implements for use on traditional farms (forward linkage). The economic importance, in terms of volumes of flows, varies; some linkages which exist in theory may be unimportant in practice. But others will prove to be essential for economic development, and if they do not arise in response to economic inducements, they will have to be created through public policy in order to reach economic development goals. Other linkages not illustrated which link the four sectors are the resource markets (land, labor, capital) and the markets for final products.

plier effects are depended upon through which program benefits "trickle down" to the follower.

Economic development is a multifaceted process. Planners of balanced economic growth need a more complex analytic framework than the dual leader-follower model. The number of sectors used herein to analyze the impacts of agricultural development in the economy of a developing nation is not two, as in dual models, but four: a traditional agriculture; an advancing agriculture; a rural, nonfarm economy; and an urban economy *[6]*.

Programs introducing advanced agricultural technology reach some, but not all, farmers. Some farmers continue to use water buffalo while others learn to operate and maintain tractors. Technological advance can act as a wedge splitting agriculture into two sectors—an advancing sector standing alongside the traditional one. The advancing sector will be relatively small in a developing country. As the nation grows, the advancing agricultural center will come to dominate agriculture. Most farm products will come from the advancing sector, even though a large number of families continue in the traditional patterns.

A bag of rice from a modern farm looks just like a bag of rice from a traditional farm. Because of the perfect substitutability in the market place of the products of the two kinds of farm, the two agricultural sectors are often viewed as a single sector. However, marketing institutions relied upon by the two sectors may be different, and production methods are quite different. Resource allocations are different. The abilities to pay for land, labor, and capital differ. These differences influence income distribution and growth. Yet the two sectors are closely related through the substitutability of their products. For that reason, a small economic advantage in one agricultural sector can have strong impacts on resource allocation, profits, wealth, and the level of well-being in the other.

The nonfarm sector of a developing economy is often viewed as an advancing urban sector. This sector includes the industries linked to the advancing agriculture by farm input markets and farm output markets—forward and backward linkages. This urban oriented viewpoint tends to overlook a significant proportion of any economy, developed or not, which is neither urban nor agricultural. This is the rural, nonfarm sector, which is important in providing nonfarm goods, services, and jobs to rural people, and in processing and transporting farm and rural nonfarm products to urban markets. In a developed economy, the rural (nonmetropolitan, nonfarm) sector may account for one-fourth of the nation's population.

Allocation of land, labor, and capital among the four sectors, and forward and backward linkages among sectors through intermediate products, are considered in the subsequent analysis of economic development. The analysis considers five kinds of changes that can influence progress in a developing nation: (1) new technology, (2) expanded markets, (3) increased resources, (4) new institutions, and (5) changed spatial relationships.

Tull explains his motivation for inventing a seed drill, when England was a developing nation *[35]*.

> The first occasion of making my drill for fine seeds was this: It was very difficult to find a man that could sow clover tolerably; they had a habit (from which they could not be driven) to throw it once with the hand to two large strides and go twice on each cast; thus with nine or ten pounds of seed to an acre, two-thirds of the ground was unplanted, and on the rest 'twas so thick that it did not prosper. To remedy this, I made a hopper, to be drawn by a boy that planted an acre sufficiently with six pound of seed; but when I added to this hopper an exceeding light plow, that made six channels eight inches asunder, into which two pounds to an acre being drilled, the ground was as well planted . . . . But the sort of seed which is most saved by the drill is St. Foin . . . .
>
> After I had learned . . . that scarce any [seed] . . . would succeed, unless covered at a certain exact depth . . . I employed people to make channels, and sow a very small proportion of seed therein, and cover it exactly . . . . [But finding it difficult to get workers to obey instructions exactly], I was forced to dismiss my laborers, resolving to quit my scheme, unless I could contrive an engine to plant St. Foin more faithfully than such hands would do . . . I composed my machine. 'Twas named a drill; because when farmers used to sow their beans and peas into channels or furrows by hand, they called that action drilling.

A more recent illustration that new technology can destroy jobs as well as create them is taken from modern day Indonesia:

> . . . contrary to what was presumed by many development economists, our survey indicates that the new high yielding rice varieties employ less labor per hectare and per unit of value than do traditional rice varieties . . . . Apparently there is a substantial reduction in plant care–hoeing, weeding, and water control–prior to harvest . . . it would appear that increased adoption of the new seed varieties will not provide a panacea for regional unemployment *[21, p. 79]*.

More labor will be required by the nonfarm sector because of linkages to the advancing agriculture. Expanding demands for labor by rural nonfarm industries and urban industries, and possibly by advancing agriculture, may fail to offset the

release of labor from the relatively labor-intensive, traditional agriculture. This leads to decreased utilization of labor in the nation as a whole and to downward pressure on wages. A cost-price squeeze associated with lower prices received for agricultural products, and with rising prices paid for land and capital can displace persons in the traditional sector faster than they can be absorbed elsewhere in the economy. Additional labor market problems arise when unskilled labor released from the traditional sector cannot meet demands for skilled labor in growing nonfarm industries.

Adoption of new technology by the advancing sector of agriculture has favorable impacts on those who make the adoption. Forward linkages, if they form adequately, lead to expansion in nonfarm rural and urban industries, and increased supplies of both farm and nonfarm products become available at lower prices. The land and capital markets become tighter, and rents and interest rates may rise, to the benefit of property owners.

Adverse effects stem mostly from impacts on the traditional agricultural sector. Prices received for farm products fall, while prices paid for land and capital rise. Some resources are reallocated to the advancing sector, but for persons remaining in traditional agriculture, a cost-price squeeze is likely, and net incomes decline. The squeeze could increase poverty and heighten pressure for migration from rural to urban areas. More labor may be released from the traditional agricultural sector than is absorbed by expansion in advancing agriculture or in the rural and urban industries. Unemployment increases and wages decrease.

Unemployment and underemployment are recognized as possible consequences of rapid technological advance *[30, ch. 31]*. The concept of introducing intermediate or appropriate technology is, in part, an effort to overcome the deleterious impacts of high technology on unemployment and income distribution *[31]*. "Development consists primarily of employing existing resources in a different way, in doing new things with them" *[32, p. 68]*. Even so, technology cannot be expected to solve all the economic problems experienced by countries with rapid population growth, limited capital, and extensive poverty.

Some technical advances may idle resources on a part-time or seasonal basis. For example, labor used for seeding and cultivating may be affected to a larger extent than that used for harvesting. To meet seasonal labor problems, it has been proposed that "The development of village industries should be as much a matter of state action as the increase of agricultural production" *[12, p. 315]*. Peasant land holders in Japan developed artisan activities to provide supplementary employment for seasonal agricultural labor *[27]*.

> There exists seasonal unemployment in the rural sector. In order to provide employment to farm labor during the slack season, the establishment of agro-industries, public works programs in the rural sector and the creation of infrastructure in the rural areas is suggested. This not only would provide employment in the slack season but would also stimulate the

> demand for agricultural output and reduce marketing, transportation and storage costs of farm commodities. However, one can also think of mechanizing some of the farm operations during peak labor demand months and hence reduce the demand for labor during those months. By doing so, we can pull some labor from the rural sector and provide employment by creating more employment opportunities in the urban-industrial sector *[22, p. 62]*.

The above analysis shows that while many of the direct and individual economic impacts of adoption of new technology are favorable, there are some unwanted consequences as well. Of particular concern is the tendency to create unemployment and underemployment for those who are displaced from agriculture and also for those who remain in agriculture but do not adopt the new methods. Economic development strategies which introduce advanced methods to agriculture must consider (1) the adoption of appropriate rather than high levels of technology, designed to minimize adverse economic impacts on traditional farmers and (2) the creation of nonfarm jobs to absorb persons displaced from agriculture by the advanced production methods. Part of the strategy may be to introduce appropriate advances in technology to the traditional agricultural sector.

If a new technology is introduced to the traditional sector instead of the advancing one, the resulting impacts may benefit the traditional sector at the expense of the advancing one. For example, consider adoption of a public measure to reduce disease in work animals. Assume this does not affect resource productivity in the advanced agriculture sector, where tractors are used instead of work animals. Since the products of the traditional and advancing agricultural sectors are perfect substitutes, a small advantage in one sector may lead to a reallocation of resources into the advantaged sector from the relatively disadvantaged one. In this example, a small comparative advantage is extended to traditional agriculture. Output from traditional agriculture may be expected to rise, exerting downward pressure on prices received. Lower prices received by farmers will discourage output from the advanced agricultural sector where techniques are assumed not to have changed. Forward linkages through the rural nonfarm and urban industries may be comparable to those associated with the advance in the modern agricultural sector and result in increased nonfarm output and lower prices received.

But impacts on the factor markets of a relative advantage for the traditional agricultural sector are different. Traditional farmers use more labor but less land and capital, per unit of output, than those in the advancing sector. Consequently, a shift favoring the more traditional, less advanced agriculture leads to tighter labor markets and, if production in the advancing sector is reduced in response to falling prices received, to slack in the land and capital markets. Wages rise, but rents and interest rates tend to fall. The result of an improvement in traditional agriculture is lower incomes to those whose living depends on rent and interest,

side effect of reducing farm income. One approach to maintaining farm income in such situations is through modification of the market institutions by means of agricultural price or income supports. An alternative is to expand both domestic and foreign markets for farm products so that larger quantities will clear the market without depressing prices. Such a policy pursued in isolation of other policies raises the prices received by farmers and stimulates added agricultural production. Let us consider the economic impacts of such a market expansion program undertaken without accompanying technological advances or other programs.

When increases in final demand result in higher prices for farm products, these price increases are passed forward to food processors and others in the rural and urban sectors. These users may reduce their purchases. While sales of food and kindred products rise directly because of the farm product market expansion, there is a tendency to reduce sales in other nonfood markets linked to agriculture, such as textiles, construction, and chemicals, because of rising costs of purchased agricultural products. If these side effects are large enough to be felt, the tendency is toward reduced quantities of nonfarm sales at higher prices, and toward reduced demand for resources by nonfarm industries. As a result, prices tend to rise for the products of all sectors–agricultural, rural, and urban. Increased demands for land, labor, and capital in the expanding agriculture are likely to more than offset the slightly reduced demands for resources in the nonfarm industries, and factor prices–rent, interest, and wages–are expected to rise.

A program to expand agricultural markets, other things being equal, is likely to benefit both the advancing and the traditional agricultural sectors. And, as a side effect, owners of land, labor, and capital stand to benefit from upward pressures on rents, wages, and interest rates. But there are some undesirable consequences as well. General price levels will tend to rise in all industries in response to inflationary pressures. This will slacken demand for the products of certain rural and urban industries and cause some plants to operate at reduced levels of capacity utilization. This will exert downward pressure on profits to some owners of fixed assets in the rural and urban sectors.

New technology plus expanded markets: The above analysis considered an agricultural market expansion program operated in isolation of other programs. What happens when it is combined with programs to introduce output increasing technology to the advancing agricultural sector in such a way that the level of prices received by farmers is about unchanged? The adverse effects on owners of fixed assets in related nonfarm rural and urban industries are removed. But, adverse effects on the traditional agriculture sector and on the labor market are introduced, to the extent that the adopted technology gives a comparative advantage to advancing agriculture. Balanced growth among all sectors will be shown in a later section to require explicit nonfarm policies to complement and assist agricultural growth policies.

Export and import markets: Market expansion for agricultural products can be in the form of increased domestic use, expanding exports, or reduced imports. It is worthwhile to consider the appropriateness of the market expanding insti-

tutional arrangements. Appropriate technology emphasizes the expansion of local village markets for goods and services, the production of which increases the utilization of local resources. For example, India once set a target that 60 percent of village textile output would be locally consumed, with the target rising to 80 percent in the course of time *[17, p. 4]*. There are innumerable opportunities for potential benefits to be lost through inappropriate off-farm handling of imports of farm inputs and materials and exports of agricultural products, even through appropriate technologies are adopted on the farm.

In many developing nations, an increase in agricultural output is destined for export. Export expansion programs can lead to gains in foreign exchange through an improved balance of payments. But the gains may be less than could have been achieved through alternative policies. First, it may be more advantageous to process and distribute farm products locally, as, for example, through increased domestic consumption of animal products, rather than the exchange of livestock for imports. Secondly, if export is an appropriate outlet, it may be more advantageous to seek opportunities to add value through processing within the country as an alternative to exporting the raw product. Export canned meats, for example, rather than live animals.

Most advantages of increased farm output can be captured domestically instead of lost through lower prices or through increased exports if increased output can be used to reduce imports. For example, increasing the output of rice to reduce food imports can make a nation more nearly self-sufficient in food. However, malappropriate techniques to achieve import substitution may lead to disenchantment if they are based on "large scale, urban-based, foreign-owned firms" *[5, p. 2]*.

Backward linkages affecting the supply of purchased farm inputs may also dissipate potential gains in income and employment from expanding the markets for farm products unless appropriate policies are adopted. For example, prospective gains to the nation may be diminished if increased demands by farmers for purchased machinery and fertilizer are met by imports rather than by domestic production. Appropriate policies may be required to insure that backward linkages are formed through use of *local* land, labor, and capital rather than through imports of farm inputs. To the extent that some imports are necessary, long-run emphasis can be directed toward importing raw materials as much as is practical with a view to adding value through domestic processing and manufacturing.

3. Increased Resources

Policies to increase availability of land, labor, and capital in a developing nation can be important contributors to economic growth. Programs to enhance availability of natural resources, upgrade labor skills, or provide capital to one economic sector will have impacts on the output and prices of all sectors.

No matter which resource is increased or which sector receives the initial direct impact, there is a tendency for utilization of that resource to lead to an increased output in *all* sectors. The more the various sectors are interlinked through forward and backward linkages, the more responsive any one sector will be to changes in resource availability in another sector. This output increasing effect implies a tendency toward downward pressure on all final product prices in response to an increase in the availability of any resource.

The largest increase in quantity produced does not necessarily accrue to the sector initially affected by the resource increase. For example, an increase in agricultural land will not necessarily generate a proportional increase in output. Gains are limited not only by diminishing returns to land, but also by reduced prices received by farmers. If prices received fall by a greater percentage than output increases, then the market is inelastic and the gain in output will be relatively small. But the reduction in price can stimulate increased output in rural and urban industries which purchase farm products. If output increases from those industries are accompanied by relatively small decreases in prices received (that is, if those rural nonfarm and urban industry markets are elastic), then the gains in quantity of output may be larger for the rural and urban industries which purchase cheaper farm products than the gains in the agricultural sector to which the increased land was made available. Competitive adjustments will result in the largest percentage gain in output, in response to an increase in resource availabilities, in the sector with the most elastic market. Prices received will likely fall the most, however, in the sector with the most inelastic market. In general, markets for urban products are relatively more elastic than those for farm products. Hence, regardless of which resource increases in availability and regardless of which sector is the primary user of the resource, we can expect the greatest percentage gain in output from the urban sector and the least from agriculture. As a corollary, we can expect final product prices to fall most in agriculture and least in the urban sector in response to any increase in resource availability. Hence, the urban sector is likely to derive most advantage from an increase in the availability of land, labor, or capital; agriculture will realize the least advantage.

The tendency for keen competition between the traditional and advancing agricultural sectors, due to the substitutability of the final products of the two sectors, affects the agricultural response to changing resource availability. Both sectors may benefit directly from increased supplies of–and lower prices paid for–land, labor, or capital. But the traditional sector, with its limited reliance on the market system, will benefit less than advancing agriculture from concomitant expansion in rural and urban industries which demand farm products and also supply purchased farm inputs. This gives the advancing agricultural sector a comparative advantage.

The advancing sector has an additional advantage when it is significantly smaller than the traditional sector. Large percentage gains in output from a small advanced sector may result in relatively small percentage gains in output of agriculture as a whole. Therefore, there will be only moderate downward price pressures in response to a relatively large gain in output in the advancing

sector. That is, prices received in the advancing sector may appear to that sector to be relatively elastic. As the advancing sector exploits what appears to it to be an elastic market, the traditional sector will experience falling prices received from what is, in fact, an inelastic market and net income will be reduced on traditional farms. Hence, we can expect a relatively large traditional agricultural sector to be disadvantaged relative to the smaller advancing sector as resources become increasingly available.

More land: Consider a program which makes more land available at lower rents. Suppose it is agricultural land and that the initial impacts work through the agricultural sector. Both the traditional and advancing sectors are induced to use more land relative to labor, capital, and purchased farm inputs. The benefits are passed on through forward linkages to purchasers of farm products in the rural and urban sectors who are able to obtain more farm products at lower prices. There is a feedback to agriculture through increased supplies at lower prices of purchased farm inputs–and of consumer products–from the rural and urban sectors.

This feedback gives a small comparative advantage to the advancing agricultural sector which relies relatively more than the traditional sector on purchased farm inputs. Hence, the advancing agricultural sector will seek to increase output by a larger percentage than the traditional sector and bid away resources from the traditional sector. Relatively lower land rents may encourage the traditional sector to maintain or increase agricultural production by using more land but less labor and capital. It is as if farmers sought to maintain output in the traditional sector by using increased quantities of cheaper land for more extensive enterprises, such as cattle rather than dairy, or grain rather than vegetables. Labor and capital released from the large, but contracting, traditional agriculture can more than offset mounting demands for labor and capital in the small, but advancing, agricultural sector as well as in the rural and urban sectors. Consequently, slight downward pressures on wages and interest rates, as well as reduced rental rates, can be expected.

The overall consequence of increased agricultural land availability is increased production of final products in all four sectors (including those which are not land based), reduced prices received for final products, and reduced prices paid in all factor markets. Profits are likely to rise for owners of fixed assets in rural and urban industries and in advancing agriculture. But traditional agriculture may find itself disadvantaged because of lower prices received and a loss of a share of the market to the advancing sector.

More capital: Consider a program which makes more capital available at lower interest. Such a program would tend to increase output in all sectors and reduce prices received for final products, regardless of the sector to which capital may initially have been made available. Output increases are likely to be greatest for the urban sector where markets are relatively more elastic. Price reductions will be greatest for the farm sector where markets are relatively inelastic. Cheaper purchased farm inputs from the rural and urban sectors and lower costs of capital give a comparative advantage to the advancing agricultural sector. The traditional

agricultural sector finds receipts falling faster than costs, and returns to fixed assets are reduced. The traditional sector is likely to seek to maintain or increase production by substituting relatively cheaper capital, and purchased farm inputs from the rural and urban sectors, for land and labor. The land and labor released from the traditional sector may more than offset added use by other sectors and induce lower rental and wage rates.

More labor: A program which makes more labor available for lower wages may have output increasing and price reducing effects on agricultural, rural, and urban industries. The effects may be different between the two agricultural sectors, with the traditional sector releasing some land and capital while absorbing more labor. Enough land can be released from the traditional sector to more than offset gains in land use from the advancing sector and exert downward pressure on rents. However, reduction in capital from the traditional sector may less than offset increased capital requirements in other sectors, resulting in some upward pressure on interest rates.

The response of the whole economy to a given percentage increase in labor supply is likely to be greater than the response to an increase in the supplies of either land or capital. This is because labor costs constitute a larger percentage of total costs than do land or capital costs. Urban and rural industries gain from an increase in the labor supply relative to agriculture; they realize larger output increases, smaller price decreases, and more profits. In agriculture, declining prices received for farm products may fail to offset reduced labor costs; profits can decrease for both the traditional and advancing sectors even though agricultural output increases in consequence of the increased availability of labor. An important result is that laborers dependent on wages tend to be disadvantaged relative to property owners who depend on rents and interest.

4. New Institutions

Changes in flows of goods and services associated with new forward and backward linkages may precipitate changes in local political, social, religious, and economic institutions. Analyses all too frequently assume that appropriate institutional responses will occur as needed to deal with improved technology, expanding markets, or increased resources. For example, increased output can lead to increased dependence on market institutions and ". . . the play of forces in the market normally tends to increase, rather than to decrease, the inequalities between regions" *[22, p. 26]*. Appropriate institutions frequently fail to arise. The result is either a market failure associated with an institutional void, or malappropriate institutional arrangements. Institution building is an important adjunct to aid programs. Suppose that tomato production practices are introduced to a village where rice has been the only cash crop. Further suppose that no public policies are formulated with respect to tomato marketing institutions. At one extreme, it may happen that no such institution will arise on its own. This is one meaning of the term "market failure." The harvested tomatoes will rot on

the road near the farm because the farmers have no place to take them. The new technology will add to no one's welfare. At the other extreme, the marketing institution which arises may be a single processing plant in a distant, central city to which farmers are expected to carry their tomatoes. Once the village farmers become dependent on such a plant, it will have monopoly power over the tomato market. It may be possible for the monopsonist to exploit his power to the point that the benefits of the agricultural development program accrue to the monopsonist, rather than become distributed among the farm families in the rural villages as originally envisioned by the program.

In addition to new economic institutions, there will also be needed new political institutions to resolve conflict, and new social and religious institutions to adjust to changing values and goals associated with rising incomes and improved levels of living.

> In most . . . developing countries . . . subsistence farming is women's work . . . . When, however, large scale mechanization is introduced . . . subsistence farming must become men's work because machines are regarded as their business . . . . This . . . can only be to (women's) disadvantage because they will lose the considerable status they now enjoy . . . . Rather than attempt social revolutions of this order . . . it would be far better to . . . reduce their labors by providing them with appropriate or intermediate technology *[26]*.

Introduction of new agricultural technology needs to be accompanied by appropriate social technology as well, both on and off the farm.

5. Changed Spatial Relationships

There is a tendency for forward and backward linkages in a growing economy to create jobs in the cities at the expense of simpler linkages located in rural villages or on the farm. In the extreme, this tendency points toward an economy in which all nonfarm economic activity occurs within cities and in which only successful farmers live in the country. For example, an urban machine shop may replace a village blacksmith, or an urban creamery may replace home butter production. A side effect of adopting advanced technology on the farm, finding new export markets, or accepting a development loan can be to destroy jobs in rural areas and to concentrate new job openings in the cities. New job openings may or may not offset the number of jobs destroyed by new urban technology. This may lead to unemployment and underemployment in rural areas, migration from farm to city, and excess concentration of urban dwellers, while contributing to depopulation of the countryside.

"Perhaps the most important feature of a development strategy based on decentralization of production by means of small scale industries is that it creates

a balanced regional distribution of income and investible surplus *at source" [1]*. If one rural area is developed faster than another, population may migrate to the improving area. "Too great an influx may prove counter productive . . . it may be prudent to stimulate . . . development of areas with declining or stagnant populations" *[18, p. 45]*. Each area has to develop in an internally balanced way. Textile production "can not develop in isolation . . . [it must be] supported by the development of village industries which in turn are part of a total village economy mainly based on agriculture . . . . This brings us to the concept of area development" *[17, p. 4, 5]*.

An appropriate policy toward the spatial distribution of forward and backward linkages to an advancing agriculture is complementary with policies to deal with other side effects discussed above. Such policies need to direct the spatial flows of goods and services, people, capital, energy, and information to where they are needed. If food processing and implement manufacture are performed in the local village where the farming is done, then the technology used in the nonfarm industries related to agriculture is more likely to be appropriate to the labor and capital availabilities of the nation. Local resources are more likely to be used to produce purchased farm inputs, and the increased farm output is more likely to be processed and consumed locally. These effects contribute to an improvement in the quality of life in the same locality that is adopting the improved agricultural technology. The inducements to migration and urban congestion will be diminished. The needed social, religious, political, and economic institutions will be of smaller scale, operated by local people toward local goals and are, therefore, more likely to be appropriate.

The Nonfarm Sector

Programs to increase food supplies and improve diets were shown above to have both favorable and unfavorable impacts on the economy. In this section, it is shown that programs to develop the industrial sector also have both favorable and unfavorable impacts. The chief result of this analysis is that certain industrial development programs have plusses at exactly the points where agricultural development programs have minuses. For example, finding new leather and wood product markets for rural industries can create nonfarm jobs in villages where farmers are displaced by advancing agricultural technology. Programs to create balanced growth require nonfarm development policies which will ameliorate unintended and undesired side effects of agricultural development programs. The nonfarm policies needed to balance agricultural growth examined below relate to (1) expanded resources, (2) new nonfarm technology, (3) expanded markets for nonfarm products, (4) rural oriented regions, and (5) local rural institutions.

1. Expanded Resources

A policy to increase resource availabilities tends to increase urban production more than agricultural, and to reduce agricultural prices more than urban. This results from the forward and backward linkages among sectors, and from the relatively more elastic urban market for which output increases are accompanied by relatively moderate downward pressure on prices. No resources are excepted from this rule, not even those which are immobile or industry-specific. Impacts of increasing land specifically used in agriculture were discussed above. Capital may be considered liquid and not industry-specific for present purposes. Industry-specific labor, represented by alternative skill levels required by traditional agriculture, advancing agriculture, rural nonfarm industries, and urban industries, is discussed below.

Rural labor: Policies, not accompanied by wage supports, to increase the supply of rural nonfarm workers and workers in advancing agriculture can be expected to lead to more employment in these industries at lower wages. These workers are likely to be more skilled than those in traditional agriculture, but less skilled than those in high wage urban industries. This change in supply makes rural nonfarm wages and wages on advanced farms closer to wages on traditional farms, and it increases the gap between rural and urban wages. The response of rural nonfarm industries to the increased labor availability is to produce more rural products at lower prices. Farm and urban industries which purchase the products of rural industries, or sell products to them, are stimulated to expand through forward and backward linkages.

The response in advancing agriculture, however, may be dominated by the keen competitive advantage it gains over traditional agriculture. This advantage may allow advancing agriculture to take some of the total market away from traditional agriculture. One source of this advantage is that the lower prices for purchased farm inputs following the growth of the nonfarm sector is more important to advancing agriculture than to traditional agriculture. But a more important source of this increased advantage lies in the differences in the qualities of the labor forces required by the two agricultural sectors. Workers in the advancing agricultural sector will be relatively more skilled and more able to compete for jobs with workers in rural nonfarm industries than are workers in traditional agriculture. Hence, the stimuli to increased output from traditional agriculture are mostly through its limited forward and backward linkages to wider markets and to reduced costs of purchased inputs. Advancing agriculture not only has stronger linkages to these expanding economic forces, but also has access to more and cheaper labor. The traditional sector may be caught by lower prices received and higher cost for land and capital. These need not be offset by reduced prices for labor and purchased farm inputs, so output may be curtailed in traditional agriculture and profits may decline.

Urban labor: Policies to increase supplies of relatively skilled, higher-wage, urban labor, in the absence of wage supports, can lead to increased urban employ-

ment at lower wages. Urban industries will tend to use more capital and increase purchases through backward linkages to farms and rural industries. Increased supplies from urban industries will exert downward pressure on prices received.

Side effects on the agricultural sectors will encourage increased production, largely in response to increased purchases of agricultural products by the expanded urban sector. Some upward pressure will be exerted on prices received by farmers. Expanding demands for land, labor, and capital will exert upward pressures on rent, agricultural and rural wages, and interest. The advancing agricultural sector will gain a slight competitive advantage over the traditional sector from these economic forces and will seek to expand its share of the total market. The traditional sector may about (but probably not quite) maintain output and profit levels. However, higher wage rates in the advancing agriculture and the rural sectors may encourage workers to leave traditional agriculture. The result may be a traditional agriculture whose output is about maintained by using relatively more land and less labor.

Side effects on the rural sector will be to encourage increased production, largely in response to increased purchases of rural products by the expanded urban sector. Reliance of this sector on purchases of farm products through its backward linkages will support the expansion discussed above in advancing agriculture. Increased labor requirements by advancing agriculture will attract a number of workers in rural areas whose skills are transferable between the advancing agricultural sector and the rural sector. Consequently, the rural sector is likely to find itself paying higher wages but employing about the same number of workers. The expansion in rural sector output will likely depend on adopting methods which use relatively more capital and more purchased urban and agricultural inputs relative to labor.

Most of the consequences of expanding the urban labor supply are advantageous to the various sectors. Possibly undesired consequences include: (1) lower wages to urban workers who had jobs before the policy was implemented, and (2) an acceleration in the replacement of traditional agriculture by advancing agriculture.

2. New Nonfarm Technology

Introduction of new technology on farms creates a local environment of learning new ways of doing things which can be extended to the nonfarm sector. Some of the nonfarm industries linked to agriculture in the developed countries have been shown to have economies of scale. This is true, for example, in many segments of the food processing industry. Exploiting these economic opportunities through heavy capital investments implies demands for highly skilled labor with accompanying losses of job opportunities for unskilled labor. In countries where forward and backward linkages are sizeable, an expanding agriculture could ultimately induce a loss in nonfarm unskilled jobs and result in limited

economic opportunity for the nation as a whole. To maintain equity and increase opportunity, it is as important to introduce appropriate technology to the nonfarm, agriculture-related jobs as to jobs directly on the farm *[20]*.

Modern, large-scale industries have no place in remote rural villages. Rather, such villages are in need of small changes in the ways of doing things which can be introduced easily at minimal cost *[11]*. This applies both to industries which have close links with agriculture (agribusiness) and to those which do not.

Appropriately scaled industries can emphasize use of local materials in preference to imports, and emphasize value added to raw materials in preference to import of finished material. For example, "wherever in the world suitable soils are to be found and a source of fuel is available, burnt clay bricks are likely to be the cheapest walling material . . . in rural areas they are produced by ancient manual processes using the simplest equipment . . . today handmade bricks are much in demand" *[33]*.

Simpler technologies often prove to be more efficient than complex ones. In a study of shoemaking firms in Ghana, it was found that "the 'intermediate' machine is much cheaper to buy, easier to operate and simpler to maintain—while sacrificing nothing in terms of job quality" *[19]*. **The appropriate technology frequently turns out to be rediscovery and extension of indigenous technologies, rather than imports from developed nations** *[2]*. The same educational institutions used to promote appropriate agricultural technology can be used to help create, rather than destroy, nonfarm jobs and increase output of rural nonfarm workers.

Rural technology: Some economic development programs focus on introducing improved technology to rural nonfarm industries. To an extent, there is a ready local market for the increased output from such innovations. But, if the products are destined for nonlocal markets, such as urban textile outlets or export of wood products abroad, the increased output can be expected to exert downward pressure on prices received for rural products. Forward linkages pass beneficial effects of price decreases to the urban sector because of increased rural supplies at lower prices. Backward linkages increase the purchases of farm products by rural industries in order to maintain a larger output. But the ultimate effect on agriculture is determined by changes in the resource markets.

Resource demands are increased not only from rural industries, but also from the rural linked urban and agricultural industries: rent, wages, and interest rise in order to draw forth larger supplies of land, labor, and capital. The agricultural sector benefits from increased purchases of goods and services from rural industries at lower prices, but faces additional costs associated with increased rent, wages, and interest. If the benefits outweigh the costs, then total agricultural output will rise and some downward pressure on prices received for farm products will result. Interest rates may rise relative to wages and rents. A small relative advantage to the traditional agricultural sector may occur because that sector depends more heavily on purchases from rural industries than the advancing sector does, and it depends more heavily on labor relative to land and capital. Hence, a

possible side effect of improving technology in rural nonfarm industries may be some strengthening of the traditional agricultural sector relative to the advancing sector. Consumers benefit from increased supplies from all four sectors at lower prices. Markets for land, labor, and capital may become tighter. Most of the adverse effects are likely to be borne by the advancing agricultural sector which has become caught in a cost-price squeeze.

Urban technology: Introduction of advanced technology to increase output per unit of input among urban industries increases output and exerts downward pressure on prices received for urban products. Through forward linkages, more urban products will be supplied to farm and rural nonfarm industries at lower prices. Through backward linkages, the demand by urban industries for farm and rural products will rise. The urban purchases of farm and rural products are likely to more than offset increases in farm and rural output, and put upward pressure on farm and rural prices. Demands for land, labor, and capital will increase and rents, wages, and interest will rise. Interest rates are likely to rise relatively more than wages and rents. This will give a small comparative advantage to the traditional agriculture, which relies less on capital markets than the advancing agriculture. As a consequence, there may be a substitution of relatively more output from traditional farms for less output from advanced farms. Even so, the advancing agricultural sector can be expected to increase profits because of higher prices received and of substitution of more of the cheaper urban goods for less of the more expensive land, labor, and capital.

3. Expanded Markets for Nonfarm Products

Some nonfarm industries are directly and closely related to agriculture. A blacksmith sells services to local farmers; a village shoe factory purchases local leather. In the short run, as agriculture expands through improved technology, wider markets, and access to more resources, these agriculturally linked industries may be most important because of their complementary relation to the success of the agricultural development program. Many jobs induced through forward and backward linkages to the advancing agriculture can be appropriately located in rural rather than urban areas. Rural industries can be used to transport, process, and distribute some of the increased volume of farm output, and to manufacture and market some of the purchased farm inputs.

In the long run, development of markets for industries not closely linked to agriculture may be more important to national growth. Explicit efforts are needed to expand local rural markets, national urban markets, and export markets for nonfarm products. Expansion of local rural markets for rural industry is associated with improved rural incomes and progress in the quality of life. This includes, for example, increased use of local materials, labor, and capital to provide better housing and furnishings, clothing, processed foods, transportation, health, education, and other goods and services. Products of wood, leather, clay,

on urban product prices, which raises the cost of purchased urban goods to the agricultural and rural sectors. It simultaneously reduces the purchases of agricultural products by urban industries.

The rural nonfarm sector is generally a heavy user of farm products. Expanding purchases of farm products associated with a growing rural nonfarm sector is likely to more than offset output increases in agriculture so there will be less farm output available for final markets. This can exert upward pressure on prices received by farmers.

In the factor markets, interest rates may rise relative to wages, thus giving a comparative advantage to the traditional sector which uses relatively more labor and less capital. Profits are likely to be reduced in advancing agriculture and also in the urban sector, which may help explain why owners of fixed assets in these sectors tend not to recognize expanding markets for rural products as an important source of economic development.

New farm technology plus expanded rural markets: A strategy which expands rural nonfarm product markets complements one which introduces agricultural technology. For each negative impact of one of these two strategies, the other strategy counters with a positive impact. Two important complementary relations worth reviewing here are (1) the rural nonfarm industries can absorb labor in rural villages close to the farms from which the labor was displaced, and (2) the rural nonfarm industries can absorb some of the increased agricultural profits in villages close to the farms on which the surplus was accumulated. The two strategies—advancing agricultural technology and expanding markets for rural industry—probably belong together as part (but not all) of any overall development policy for a developing nation.

Markets for urban products: Consider a program for expanding the markets for urban products. This is likely to have largely beneficial effects on the urban, rural nonfarm, and agricultural industries. The beneficial effects derive primarily from backward linkages reflecting requirements of the urban sector for agricultural and rural products. Pressures on all prices in both factor and product markets are upward, that is, inflationary. The high substitutability of products between the two agricultural sectors may lead to some shifts between these sectors. The rising prices for land, labor, and capital may give a small comparative advantage to the traditional sector which spends relatively less for the services of land and capital and relatively more for labor per unit of output than the advancing sector. Consequently, expanding urban markets can strengthen the traditional agricultural sector relative to modern agriculture.

4. Rural Oriented Regions

Man has steadily concentrated places of work and residence in and around cities. Even so, most of the inhabited space, even in developed nations, is rural. An economic development program for a nation must be concerned, in part, with

geographic places which are relatively isolated from urban activity. A nation is concerned with appropriate development for people living anywhere in its entire land area, not with rapid development of only its urban centers.

Some farmers and rural nonfarm people live within easy access of urban places, but most find themselves isolated from such places and relatively few members of rural villages make frequent trips to urban centers. Smaller towns and villages, although isolated from the major urban centers, function as the central places for rural oriented communities. In a developed country, rural oriented regions may take up most of the land area but contain a small percentage of the population. In a developing nation, such areas are likely to contain most of both the land area and population.

Rural villages and towns may be isolated from central urban places, but they are not necessarily isolated from each other. Small villages may be within walking distance of one another and easy motorcycle distance from other small towns which provide markets for agricultural resources and products, as well as markets in which to buy, sell, or barter nonfarm goods and services of importance to village residents.

Rural villages and adjacent farm areas form a geographically contiguous functional economic unit. Local development involves such units and must focus on the whole area, not just on some of its parts. In addition, these units are economically and socially linked with other nearby villages and towns. These larger geographic areas connecting several villages may be appropriate regional units on which to base many economic development programs. For example, the local village may be the appropriate area to consider when adopting new technology for baking food for local consumption, whereas a rural oriented region comprised of several villages and a small town may be the appropriate area to examine for suitability of a shoe factory.

Programs which concentrate on expanding the agricultural sector through advancing technology, expanding markets, and increased availability of specialized resources are not in the public interest if they fail to account for impacts and side effects on local regions. If the development programs are accompanied by job displacement of villagers and traditional farmers, bypassing of local service and trade facilities, and outmigration of the disadvantaged, then regional imbalances will arise, presenting new social and economic problems.

5. Local Rural Institutions

Failures in past aid programs, wherein developed nations have sought to improve living standards in developing ones, may be partially attributable to inadequate consideration of local rural institution building *[25, p. 1]*.

> It is not enough to design an appropriate technical or management innovation for use in developing countries; information

about the idea, whatever it is, has then to be disseminated . . . . There is thus a need for a delivery system which will introduce new ideas on a wide scale, especially in rural areas where communications are poor, where strangers may be mistrusted and where the well-educated minority, even if they originate from the area, are unwilling to return *[13]*.

Introduction of appropriate technology may induce changes in local economic, social, political, and religious institutions. Appropriate policies for nonfarm institutional arrangements accompanying extension of aid and adoption of new technology in agriculture will need to consider: that needed market institutions arise, that the new institutions themselves use appropriate technology which meet local and community needs, and that the benefits from value added through processing and distribution are distributed equitably. This may include government regulation of marketing institutions and encouragement of cooperative ventures.

Local institutions are needed to coordinate diverse, well intentioned efforts that might reach specific program goals but have unintended and undesired side effects. For example, "the 'ruralization' of conventional schools to increase the relevance of rural education . . . in most cases has been an isolated action unsupported by the creation of productive jobs for school leavers" *[15, p. 290]*.

New technologies and new ways of doing things challenge established attitudes, values, and beliefs. The idea that vertical motion of a piston is mechanistically related to the rotary motion of a driving wheel may be in conflict with local religious beliefs concerning cause and effect. One idea cannot be adopted without raising conflicts about holding another. "The goals of peasants extend beyond profit maximization . . . and are realized primarily through religious and secular ritual, kinship ties, and other social obligatory actions" *[6; see also 29, ch. 4]*. "It is the character, preferences and expectations of the people and the nature of their response . . . that determine the pace of economic development rather than the economic or financial soundness of the plan itself" *[34, p. 27]*.

It is sometimes asserted that introduction of intermediate technology through technical advice and finance should be accompanied by large-scale management and marketing functions *[16, p. 145]*. This may be a mistake. Success of a program emphasizing new ways of doing things requires not only that technology is appropriate to local resources and markets but also appropriate to local cultural patterns.

Economic institutions may be required to create markets where exchange was primarily barter. These markets will need to link villages with nearby towns and with distant cities, domestic or foreign. They need to be built with concern for equitable distribution of income in addition to efficient distribution of industry products. Other local institutions will be required to assess ends and resolve various local and national conflicts while adjusting from a traditional society to an advancing one.

Conclusions and Implications

An objective of economic programs in developing countries is to increase food production, feed an expanding population, and support economic growth. There is concern both with the efficiency of producing and with the equity of distributing added food and income.

An appraisal of the total impact of such programs for agricultural development requires that impacts on well-being in all sectors of the economy are monitored. Changes in one attribute of the economy, such as introduction of advanced technology to agriculture, have impacts throughout the economic system. Some consequences are desirable and some are not. This paper examined strategies designed to offset unwanted side effects of agricultural development programs and to balance national and regional growth.

Intermediate agricultural technologies, which are efficient and also appropriate to social, religious, political, and economic conditions, are preferred to high technologies. The latter may appear to drive faster and harder toward efficiency goals, but appearances can deceive. High technology, even when successfully adopted by the advancing agricultural sector, tends to increase the income distribution problems between the haves and have-nots. Even appropriate agricultural technology, if taken as a single means toward a single end, can have undesired side effects. Two mechanisms through which the effects of agricultural advance are transmitted to the rest of the economy are (1) forward and backward linkages from the advancing agricultural sector to the nonfarm sectors and (2) changing opportunity costs for resources, particularly for unskilled nonfarm employment.

A successful program to increase food supplies in developing countries needs to be accompanied by companion strategies to maintain balanced growth throughout the economy. The companion strategies serve to increase the availability of local resources, introduce appropriate technologies in the nonfarm sectors, expand markets for local products, ensure equitable regional distribution of economic gains, and build appropriate institutions.

Unskilled labor is the **resource** most likely to be in abundance and underused. Some policies emphasize birth control or migration strategies to deal with the labor surplus. The latter tends to be more a way to transfer the problem from one region to another than to solve it. Education programs which raise the skill levels of these workers and enable them to join a relatively skilled labor force appear promising. Policies to introduce large inputs of capital from abroad tend to accompany inducements for malappropriate technologies and institutional arrangements; emphasis at first should be on finding appropriate opportunities for small increments of local capital accumulated from the increasing agricultural surplus. Natural resource development policies may emphasize development of indigenous materials, including minerals, timber, and water, for use in both farm and nonagricultural industries.

There is a tendency for the gains from increased availability of agricultural resources to be captured not only by the advancing agricultural sector, but also by the urban sector, with adverse side effects on traditional agriculture and on the nonfarm rural sector.

Technological advance must be appropriate for nonfarm as well as farm economic activity. This includes finding ways for processing and distributing farm products and for manufacturing and marketing purchased farm inputs. It also includes finding ways to encourage village and urban nonagricultural industry development needed to create jobs and increase productivity of unskilled labor. Introduction of appropriate technology requires on-the-job training for workers as well as technical assistance for entrepreneurs. The burden for conducting research and disseminating new ideas may, in the beginning, depend on nonlocal people, but implementation and further developments of appropriate technology over time should become endogenous. New technology tends to be advantageous to those who adopt it, but can displace workers and can increase the economic problems of some of those who do not adopt it.

Market expansion should concentrate on local village markets first. Derived demand for jobs for unemployed village residents depends on building the economic base of the village community. The quality of life of those residents depends on their opportunities to consume what they produce. Domestic urban markets should receive attention second, and expanding markets for exports third. Value added domestically is preferred to exports of raw materials. Import substitution and domestic value added to imports of raw materials add to derived demands for domestic resources.

Expanding domestic and export markets for the products of rural industries creates a demand for rural workers which can complement an aid program which increases food supplies by displacing traditional workers in agriculture. Expanding domestic and export markets for agricultural products encourages increased utilization of resources and enhances the agricultural sector. But higher costs to nonfarm and to urban industries of farm products and of resources can reduce profits to owners of fixed assets in some of these industries.

Regional emphasis should begin with development of a rural, nonfarm economy in the agricultural village and small town. At first, the local economy may be linked to the agricultural base, but over time nonagricultural industries need to be developed to sustain regional growth. Explicit policies need to be implemented to develop transportation and communication channels among villages and small towns and between these and the larger urban centers. Policies need to address equitable regional dispersion of economic development over the entire nation and need to be concerned with maintaining a rural-urban balance.

Failure to attend to regional balance may result in losses of jobs, income, and capital investment in rural oriented regions even though the agricultural sector is successfully advancing there. Consequent outmigration can result in concentration of the jobless and the underemployed in major urban centers.

Institution building may emphasize economic institutions, including those which create markets for goods and services, money markets and institutions

which establish goals and plans for economic development. But these must be accompanied by concern for building social, religious, and political institutions as well, which are organized to assess goals, resolve conflicts, and deal with change.

New institutional arrangements are needed as an adjunct to programs to expand food supplies in developing countries. These are needed both in and out of the advancing agriculture to establish forward and backward linkages to the non-agricultural sector and to provide for efficient reallocation of resources. Failure to provide these needed economic and social institutions at all can result in failure of the food expansion program. Failure to provide these institutions appropriately can result in an undesirable inequality in the distribution of the benefits of the food program.

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